

CLAIMS

What is claimed is:

- 5 1. A plunger return spring for use in a well in an hydraulic valve lifter wherein said well has a diameter **D** and wherein the non-compressed length **L** of said plunger return spring is greater than said diameter **D**.
- 10 2. A pin housing sub-assembly for use in a valve deactivation hydraulic valve lifter, said sub-assembly including a plunger return spring disposed in a well in said pin housing sub-assembly wherein said well has a diameter **D** and wherein the non-compressed length **L** of said plunger return spring is greater than said diameter **D**.
- 15 3. A pin housing sub-assembly in accordance with Claim 2 further comprising:
- a) a plunger sub-assembly disposed against said spring;
- b) a pushrod seat assembly spaced apart from said plunger sub-assembly to provide a hydraulic chamber therebetween within said pin housing;
- c) an annular groove formed in said pin housing; and
- 20 d) an expansion ring disposed in said annular groove, said expansion ring being removable from said groove by a spring tower to become a locking ring between said pin housing and said spring tower during assembly of said hydraulic valve lifter.
- 25 4. A valve deactivation hydraulic valve lifter for use in an internal combustion engine, comprising a pin housing sub-assembly including a plunger return spring disposed in a well in said pin housing sub-assembly wherein said well has a diameter **D** and wherein the non-compressed length **L** of said plunger return spring is greater than said diameter **D**.

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5. A valve deactivation hydraulic valve lifter in accordance with Claim 4 wherein said pin housing sub-assembly further comprises:

a) a plunger sub-assembly disposed against said spring;

b) a pushrod seat assembly spaced apart from said plunger sub-assembly to

35 provide a hydraulic chamber therebetween within said pin housing;

c) an annular groove formed in said pin housing; and

d) an expansion ring disposed in said annular groove,

said expansion ring being removable from said groove by a spring tower to become a locking ring between said pin housing and said spring tower during assembly of said

40 hydraulic valve lifter.